





# Joint Command and Control for Net-Enabled Weapons (JC2NEW) Joint Test (JT)

# Managing the Net-Enabled Weapons Kill Chain

Testing in a Live-Virtual-Constructive Environment

Col Steven J. Walker, USAF Director

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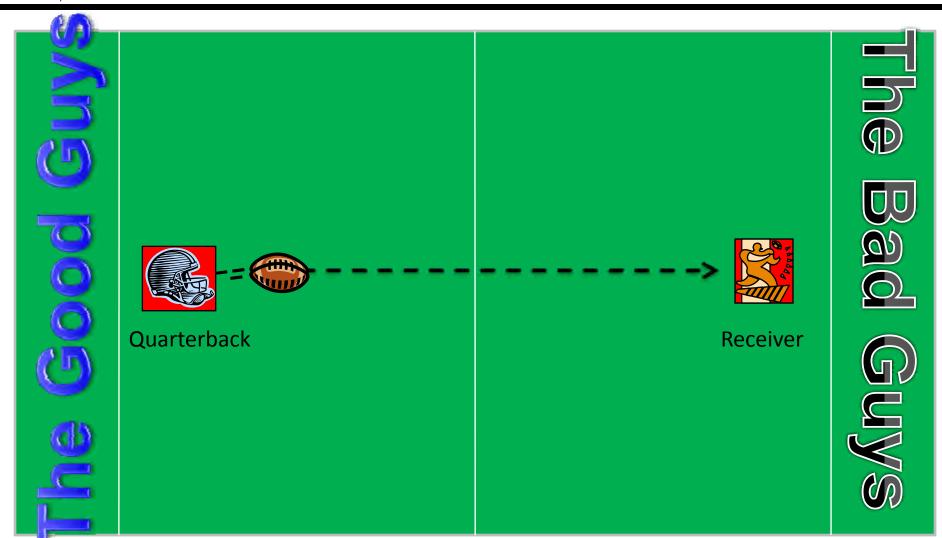
**Report Documentation Page** 

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### the way it is now.....



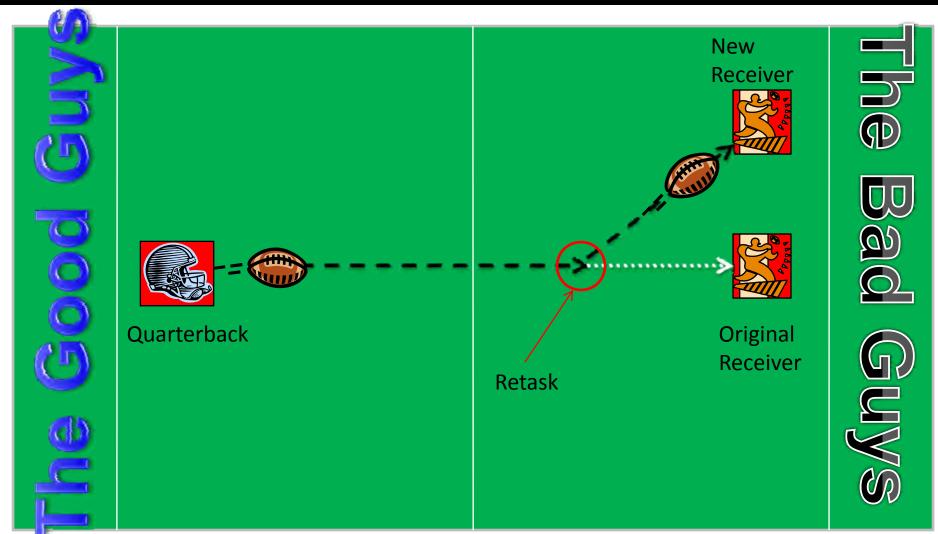


Fire and forget...



#### What if you could call the football?



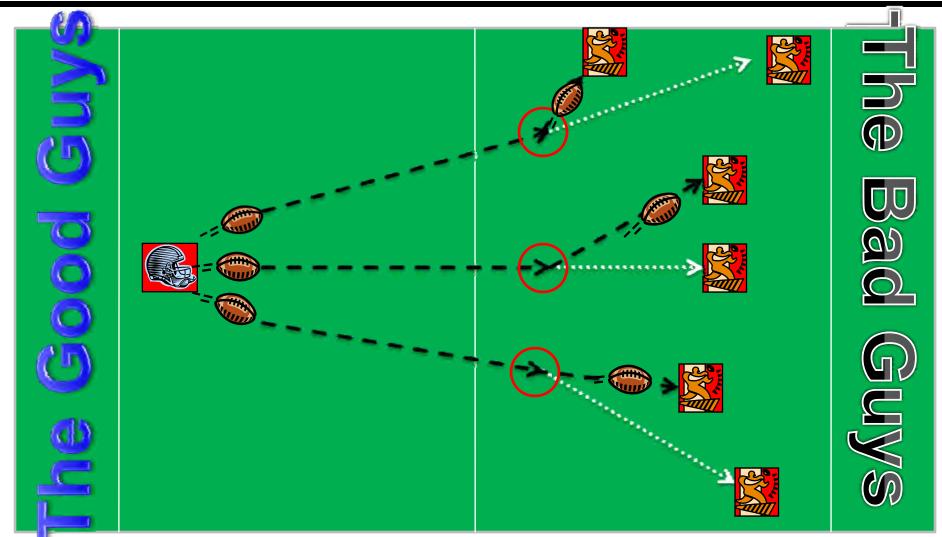


You enable QB to change receiver after he throws the ball!



### What if you had more than one ball?

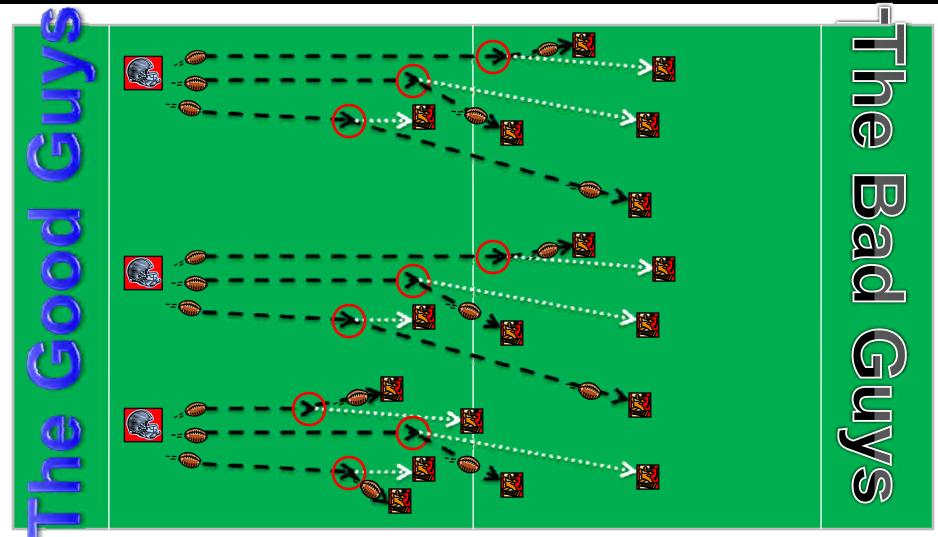






#### More than one quarterback?





We can do this now with Net-Enabled Weapons using C2 processes



### **Net-Enabled Weapon**



#### Evolving Definition:

"Weapons whose functions can enhance, or be enhanced by, network operations to include initial targeting; launch; fly-out; re-direction; re-targeting; bomb-hit-indications (BHI); health and status; location; sensor operations; and loiter/self-destruct actions."\*

Warfighter Translation
 "A net-enabled weapon is another weapon in our tool kit. We need to understand and learn how to optimize its effectiveness."

<sup>\*</sup>Joint Capabilities Integration and Development System Architecture Concept of Operations for Network Enabled Weapons, developed by the Weapons Data Link Network Advanced Concept Technology Demonstration



# Current or Near-Term Net-Enabled Weapons



#### **Direct Attack**

WEAPON	SERVICE	IOC	TGT set/profile
NLOS-LS Precision Attack Missile (PAM)	ARMY	2010-11	Moving, mobile or fixed / short range ~40nm
Small Diameter Bomb 2	USAF	2014	Moving, mobile or fixed / short range ~30-50nm

#### **Stand Off**

WEAPON	SERVICE	IOC	TGT set/profile
SLAM-ER	NAVY/USMC	FIELDED	mobile or fixed / medium- long range 50-150nm
JSOW C-1	NAVY	2009-10	Mobile or fixed / short-medium range 15-65nm
Harpoon III	NAVY	2010-11	Moving, mobile, or fixed / short-medium range

### Long Range / Loiter

WEAPON	SERVICE	IOC	TGT set/profile
TLAM Blk IV Tactical Tomahawk	NAVY	FIELDED	Mobile or fixed / long range 700+nm
JASSM-MI Maritime Interdiction	AIR FORCE	2012 ?	Mobile or fixed / medium-long range 200+nm



### **Problem Statement**



Current operational concepts and joint command and control procedures do not support the joint force's ability to employ net-enabled weapons against dynamic targets

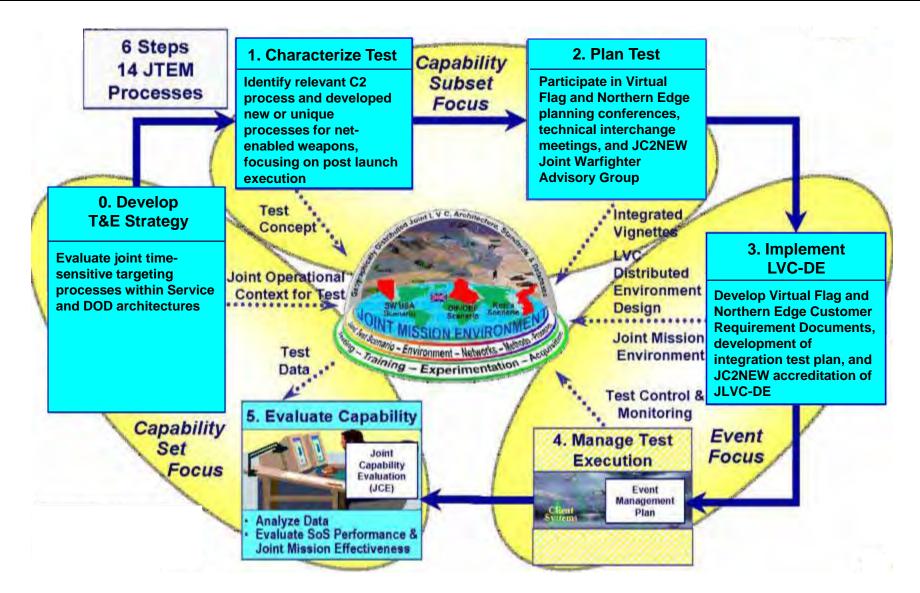


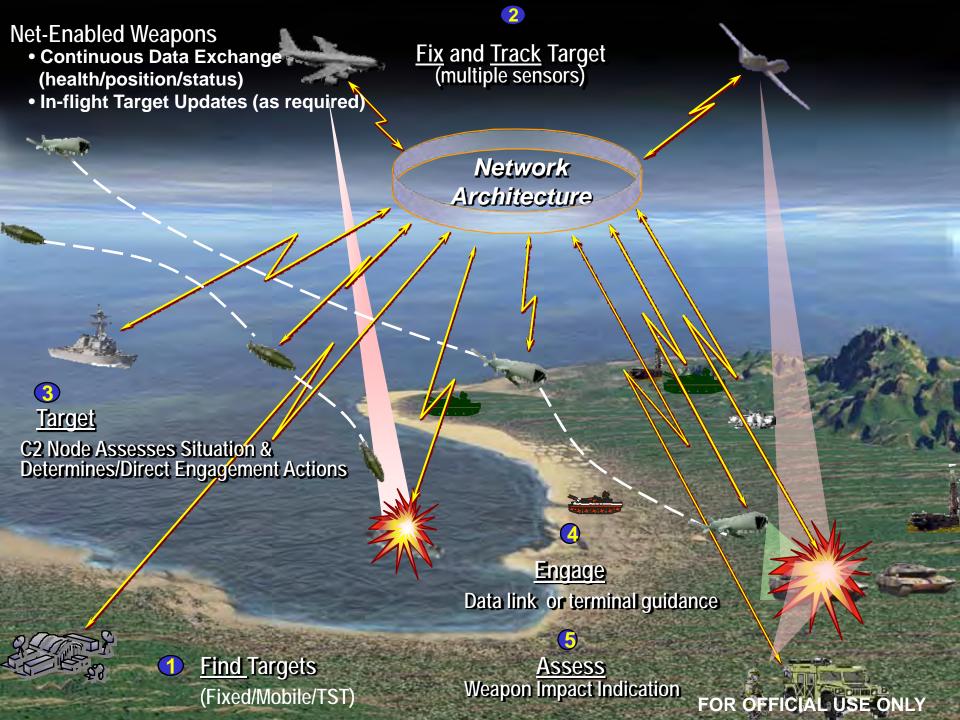
Reviewed and validated by USPACOM sponsor and Joint Warfighter Advisory Group



# **JC2NEW Test Design Approach**



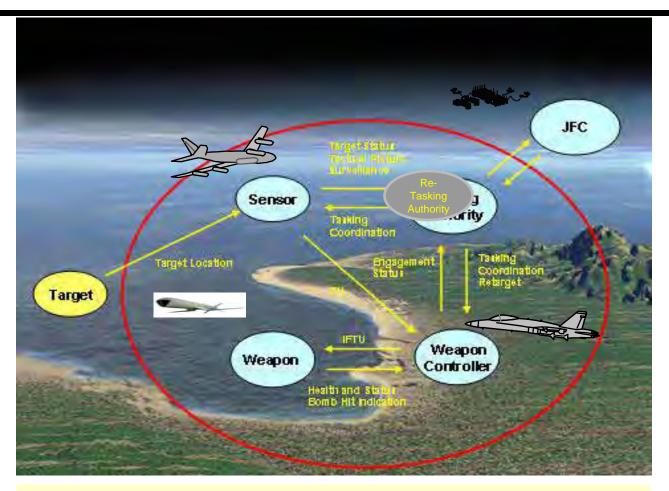






# Basic Net-Enabled Weapon Entities



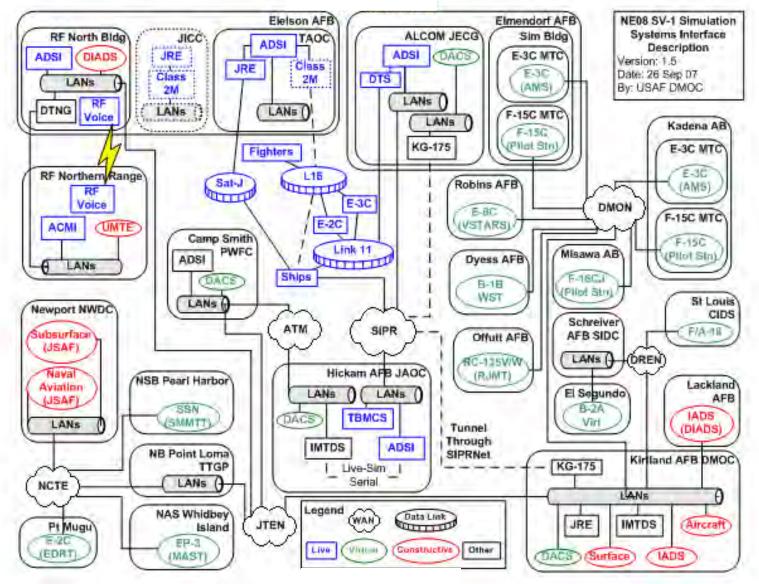


- Re-<u>Tasking Authority</u> (RA) is the entity with authority to direct post-launch execution (PLE) of a net-enabled weapon (NEW)
- The <u>weapon controller</u> (WC) is the entity designated to provide in-flight target updates, abort, loiter, and retarget NEW commands
- The <u>sensor</u> is the entity designated to track and report the target's location



# **DMOC NE 08 Systems**



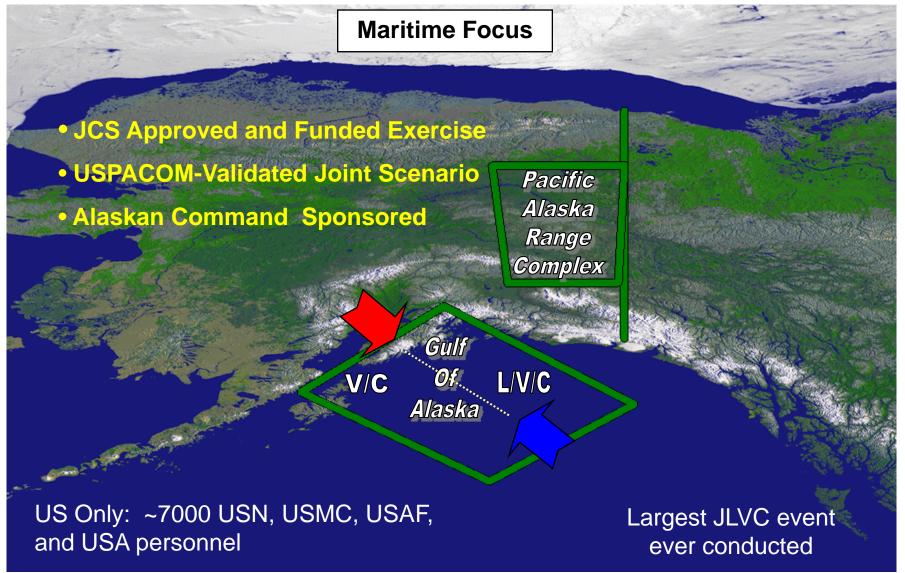




### NE 08 – DMOC LVC Hub



JC2NEW Field Test 1 (FT-1)

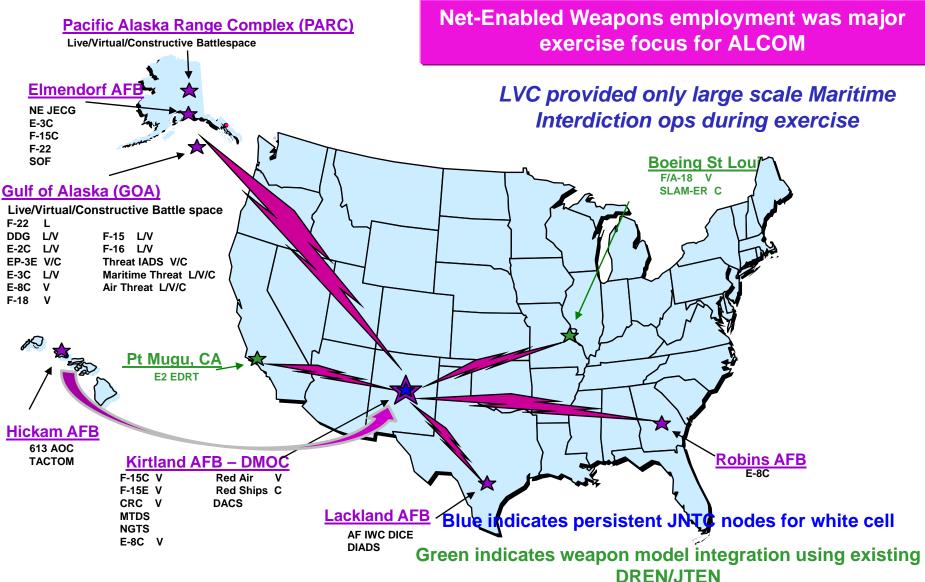




# **NE 08 (JC2NEW FT-1)**



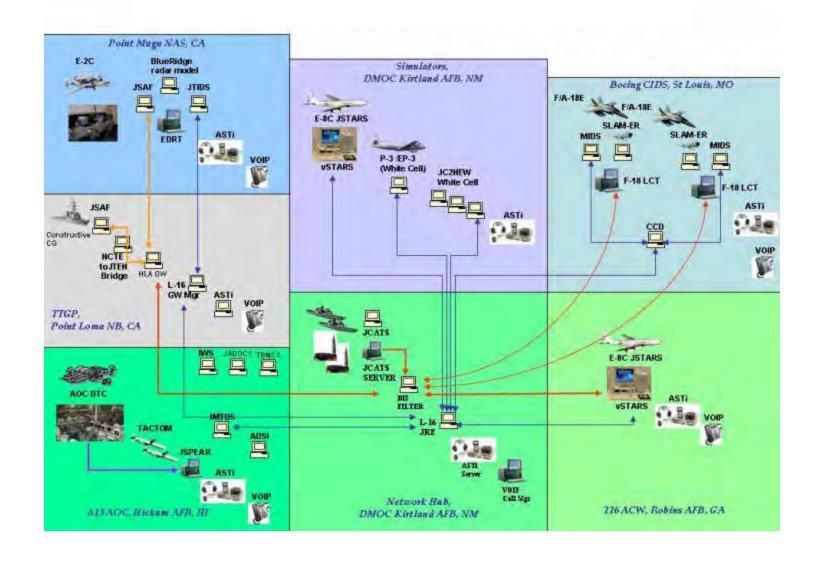
#### **Distributed Mission Environment**





# JC2NEW FT-1 Systems for NE 08







### **JC2NEW NE 08 Nodes**



- 705 CTS, DMOC, Kirtland AFB, NM
  - LVC Network Hub; E-8C Virtual Surveillance Target Attack Radar Simulation (VSTARS), constructive P-3/EP-3 simulation, White Cell test control; DREN, JTEN, Distributed Mission Operations Network (DMON) connectivity
- Pt. Mugu, CA, Naval Warfare Development Center
  - E-2C Enhanced Deployable Readiness Trainer (EDRT); NCTE connectivity
- Tactical Training Group Pacific (TACTRAGRUPAC) Pt. Loma Naval Base, CA,
  - Network and simulation tool interface for E-2C simulation; NCTE to JTEN connectivity
- Boeing CIDS St. Louis, MO
  - F/A-18E/F Low Cost Trainer (LCT), SLAM-ER 3-degrees of freedom constructive simulation;
     DREN connectivity
- 613th Air and Space Operations Center (AOC), Hickam AFB, HI
  - AOC Combat Operations to include Chief Combat Operations (CCO), Senior Offensive Duty
    Officer (SODO)/Offensive Duty Officer (ODO), Senior Air Defense Officer (SADO)/Command
    and Control Duty Officer (C2DO), Senior Intelligence Duty Officer (SIDO)/Intelligence Duty
    Officer (IDO), Dynamic Targeting Cell (DTC), Attack Coordinator, Targeting Technicians,
    Tomahawk Land Attack Missile (TLAM) Duty Officer (DO) using Tomahawk Command and
    Control System (TC2S); JTEN connectivity
  - Tomahawk Command and Control System (TC2S) integration at the AOC representing the TACTOM planning and strike cells
- 116 Air Control Wing (ACW), Robins AFB, GA
  - VSTARS; DMON connectivity



# Mission Thread Implementation LVC Environment



- The JT demonstrated the following attributes of the distributed LVC FT-1 environment:
- Integrated Sensor C2 shooter system simulations
- Functional Link-16 simulated data network
- Functional voice communications
- Functional collaborative tools
- JC2NEW scenarios provided a robust integrated dynamic and time-sensitive targeting environment
- CONOPS and TTP were clearly defined in the Net-Enabled Weapons Handbook
- Operators trained for net-enabled C2 process implementation by JT personnel
- JT personnel trained for the LVC exercise venue



#### **FT-1 Bottom Line**



FT-1 focused on a specific maritime environment comprised of a maritime interdiction mission scenario.

The overall objective of FT-1 was to:

'Refine and evaluate the TTP developed during JC2NEW's Phase I to meet the needs of the warfighter in a maritime environment.'

- Warfighters successfully executed post launch weapon re-tasking against dynamic and time-sensitive targets in the NE 08 LVC environment
  - Significantly improved engagement opportunities and responsiveness against mobile and rapidly emerging highpriority targets
  - Warfighters provided invaluable feedback on JC2NEWdeveloped TTP, which will be incorporated in the Net-Enabled Weapons Handbook



### **Observations - General**



For many warfighters, this exercise was their first exposure to netenabled weapons capabilities and processes. The 613th Air and Space Operations Center (AOC) participants recognized the value gained to the extent that they requested JC2NEW participation in future Northern Edge and Virtual Flag scheduled events

- LVC events can improve operational integration and training
  - Leverage VC to augment/replace low density, high demand (LDHD) assets, replicate MI assets/targets, and stimulate AOC level training
- The NE 08 LVC venue proved a credible environment for integrated C2 operations at Operational-Tactical level
  - Joint systems capabilities/limitations education and training lacking
  - C2 constellation fully leveraged in various configurations
    - Identified TTP opportunities for degraded ops capability gaps addressed
    - "Best opportunity we've ever had for joint ops" AWAC Msn CC



### **Summary**



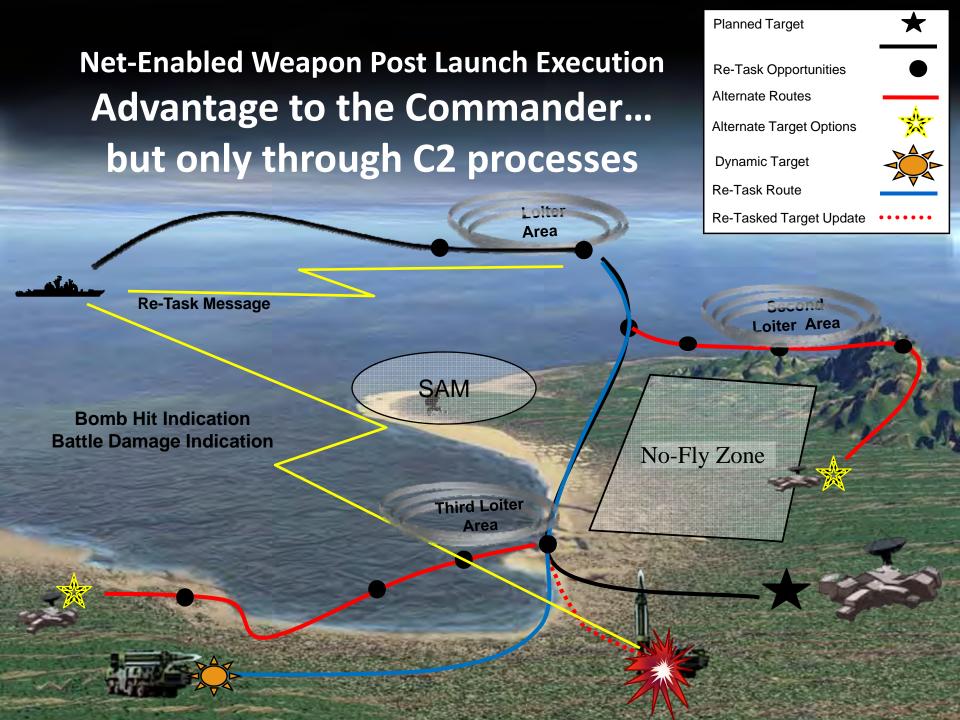
- C2 processes are the critical link to effectively engage emerging, timesensitive, moving, or relocated targets using net-enabled weapons
- The JC2NEW tailored net-enabled weapon C2 dynamic processes enable a flexible and responsive kill chain – they require:
  - Preplanning for supporting assets (ISR, 3PS)
  - A knowledgeable C2 structure
  - Clear lines of authority for actionable events
  - Comprehensive battlespace situational awareness
    - Target timeline
    - Weapon timeline
    - C2 Process timeline
- Training, training Well planned LVC exercises are excellent venues for TTP development and testing in a joint environment

When the strike of a hawk breaks the body of its prey, it is because of timing.





### **Back-up Slides**





### **Example: Tactical Tomahawk**



- Two-way satellite data link
- 15 preprogrammed alternate targets
- Net-Enabled Weapon (re-task to new target!)
- Ability to loiter over battlefield awaiting TST
- Transmits battle damage indication (BDI) imagery
- Anti-jam GPS receiver

Block IV -109E



Length 18.25 feetDiameter 20.3 inches

• Cruise Speed ~475 miles per hour

Range ~1000 SMWarhead WDU-36/B

• Launch Platform Submarine/Ship

• Navigation Inertial/TERCOM/Anti-Jam GPS/DSMAC+

Data Link UHFSATCOM

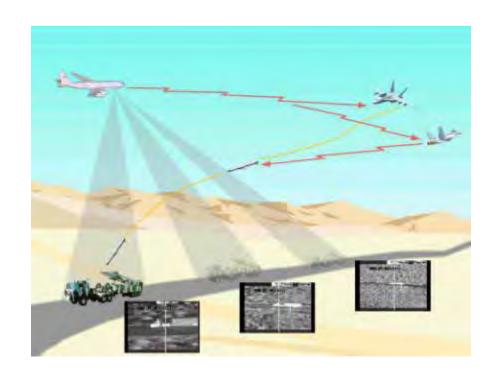
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# **High Priority Pop-Up Target**



- TACTOM is already launched to a preplanned ATO target
- Intel is received on the location of a high priority target
- TACTOM is in range
- AOC coordinates and re-tasks TACTOM to strike higher priority target
- Target has a bad day



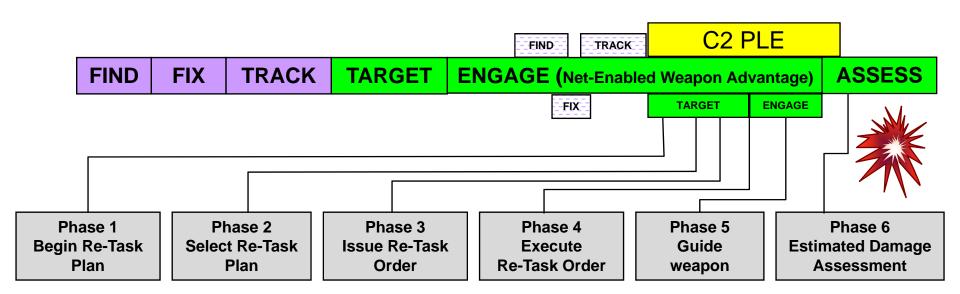


# Testing the C2 Phase Concept for PLE



Situation: After a net-enabled weapon is launched, the designated target is moving, has relocated, or a different target becomes a higher priority.

A Commander has the ability to authorize the net-enabled weapon to be re-tasked post-launch if critical C2 activities are accomplished.

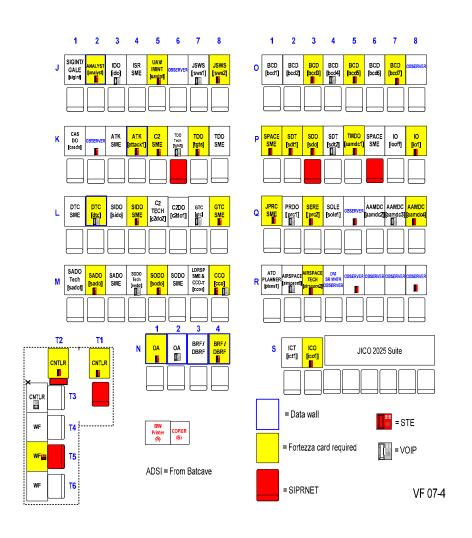




# Easy right? Not quite...



- Many players in AOC involved:
  - DTC
  - SIDO
  - SODO
  - SADO
  - CCO
  - TLAM DO
  - Airspace Tech
- Effective communication flow and C2 are critical





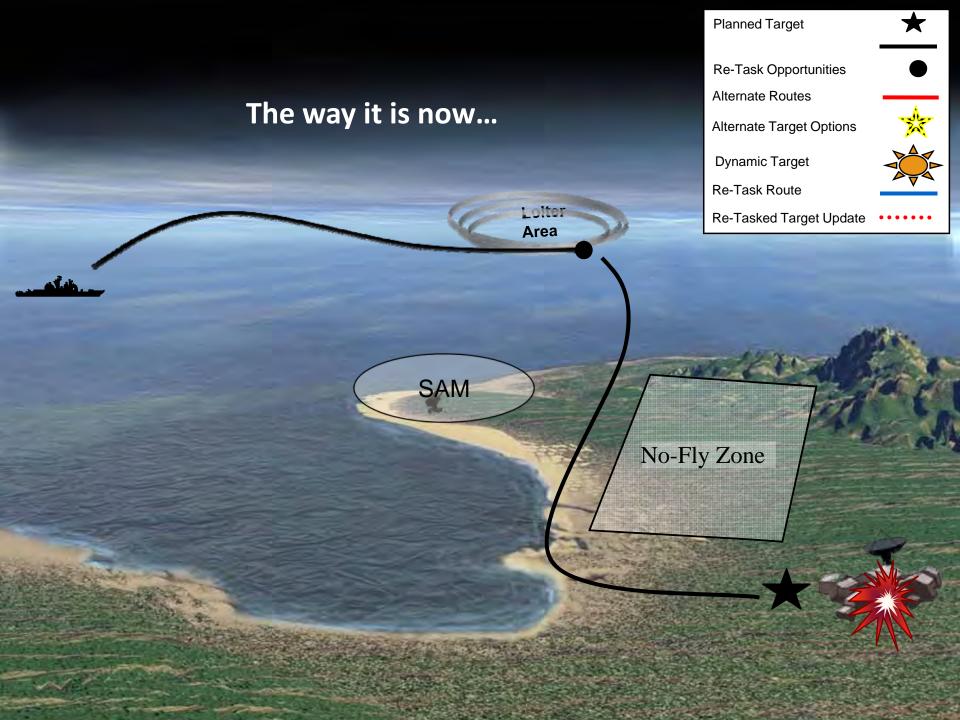
### What is JADOCS?



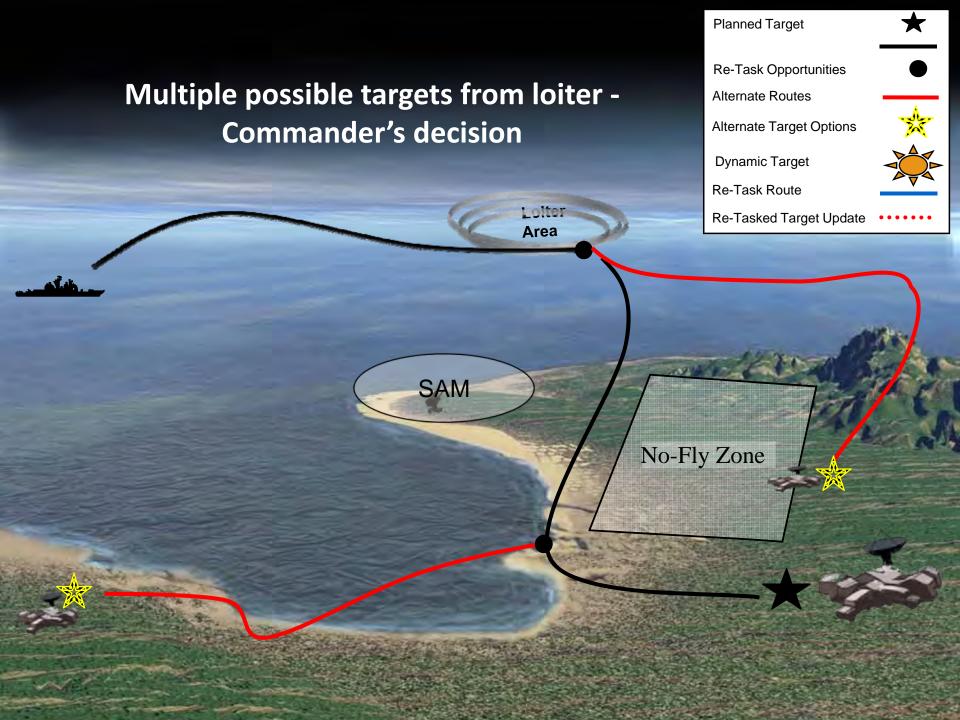
#### Joint Automated Deep Operations Coordination System (JADOCS)

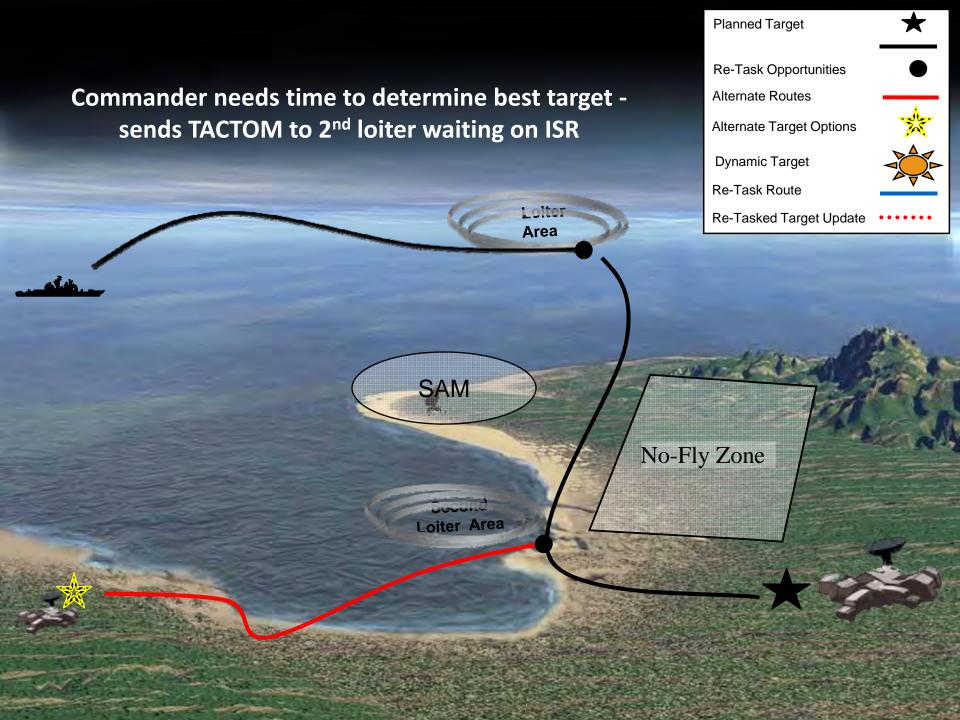
- Joint mission management software application
- Suite of tools/interfaces for horizontal and vertical integration across battlespace functional areas
- Provides capability to integrate ISR data and task offensive resources
  - Improves strike timing to coincide with enemy movements
- Over 3000 users worldwide
  - Used in support of operations in Iraq and Afghanistan, used in all US unified commands









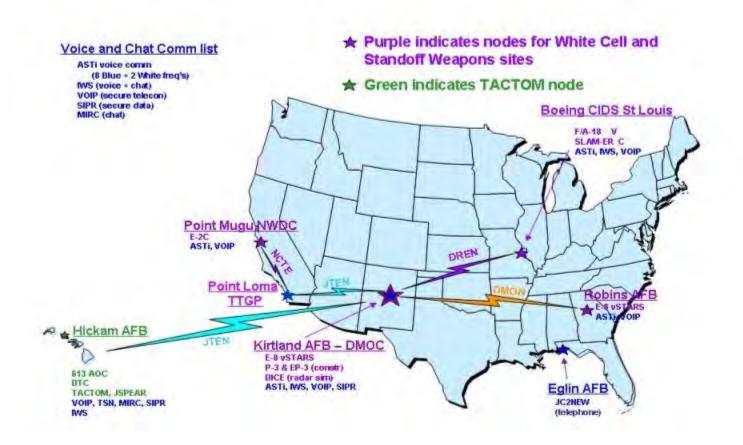






# FT-1 JC2NEW Voice Comm and Wan Connections







### **Observations - Standoff**



The JT integrated a standoff LVC environment in which Navy pilots executed F/A-18E and SLAM-ER weapons employment utilizing JSTARS third party source target data with an E-2C command and control platform in a maritime interdiction scenario.

- JSTARS 3<sup>rd</sup> Party Source track information was critical to successful target prosecution.
- Sweeper weapon TTP was utilized and increased ordnance on target in constrained operational environment.
- Estimated Damage Assessment TTP was critical to most efficient use of limited resources.



# **Observations**Long-Range Net-Enabled Weapons



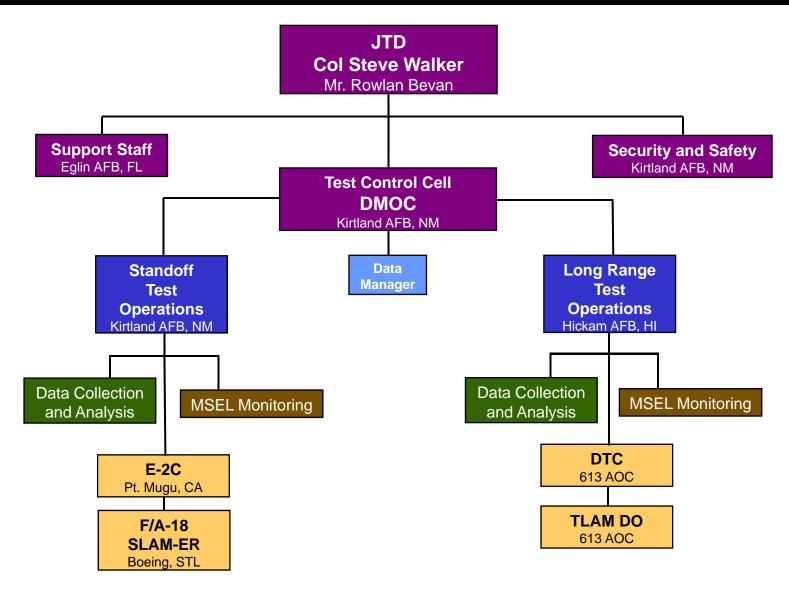
The JT integrated a long range LVC environment in which the 613th AOC Combat Operations Division, through the Dynamic Targeting Cell, executed Tactical Tomahawk missions against relocated dynamic targets using Tomahawk Mission Distribution System (MDS) to relay target and routing information to the missile post launch.

- Addition of the TLAM Duty Officer at the AOC significantly enhanced the use of TACTOM by the JFACC to counter dynamic targets.
  - This duty position may transition into a Net-Enabled Weapons Duty Officer
- Allowed the AOC to visualize the location and status of individual TACTOM missions.
  - This capability dramatically improved the AOC's situational awareness and ability to re-task airborne long-range weapons in dynamic targeting missions.
- Additional training and TTP development required for coordinated joint weapons engagements



# **JC2NEW FT-1 Test Team Structure**

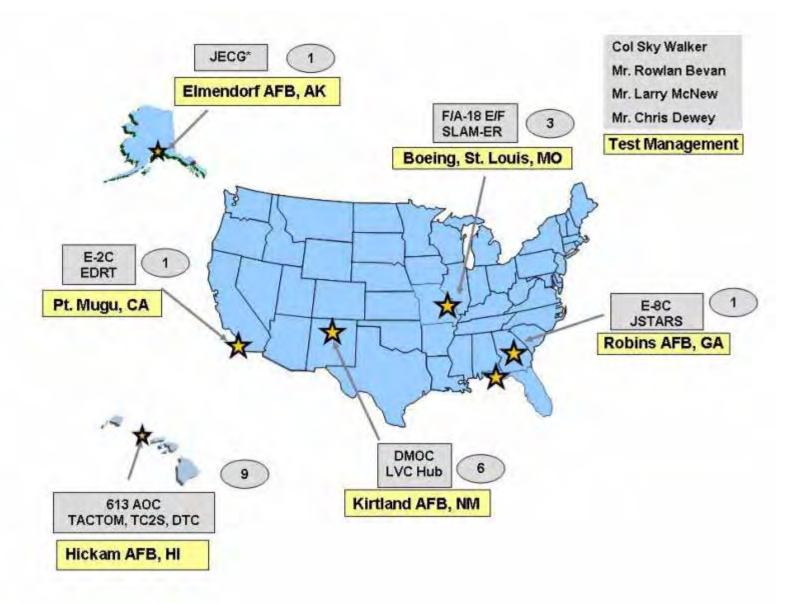






# **FT-1 Data Collection Nodes**







# 21st Century Warfighting



# Precision Engagement Full Spectrum Dominance



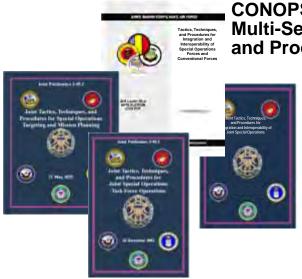
- Exploit every source
  - leverage what we have
- Provide shared situation awareness & understanding
- Support dominant speed of command
- Provide precise, synchronized execution
- Allow agility and flexibility

Enabled By Network Centric Warfare



### **JC2NEW Products**

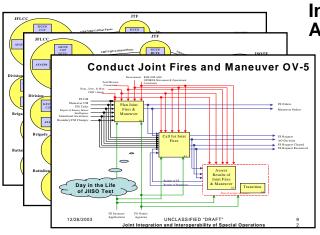




CONOPS, Handbooks, Multi-Service Tactics, Techniques, and Procedures

DOTMLPF Change Recommendation





Integrated Network Architectures Assessment

Test and Training Methodologies and Infrastructure

